

BEAM STEERING, FOCUSING AND COMPRESSION FOR WARM-DENSE MATTER EXPERIMENTS

S.M. Lidia¹, A. Anders¹, R.H. Cohen⁴, J. E. Coleman^{1,2}, M. Dorf³, E.P. Gilson³, D.P. Grote⁴, J.Y. Jung¹, M. Leitner¹, B.G. Logan¹, P.K. Roy¹, A.B. Sefkow³, P.A. Seidl¹, W.L. Waldron¹, D.R. Welch⁴

¹*Lawrence Berkeley National laboratory, Berkeley, CA 94720, USA*

²*Dept. of Nuclear Eng. University of California, Berkeley, CA 94720, USA*

³*Princeton Plasma Physics Laboratory, Princeton, NJ 08543-0451, USA*

⁴*Lawrence Livermore National laboratory, Livermore, CA 94550, USA*

⁵*Voss Scientific, Albuquerque, NM 87108, USA*

The Heavy-Ion Fusion Sciences Virtual National Laboratory is pursuing an approach to target heating experiments in the Warm Dense Matter regime, using space-charge-dominated ion beams that are simultaneously longitudinally bunched and transversely focused. Axial compression leading to $\sim 100X$ current amplification and simultaneous radial focusing have led to encouraging energy deposition approaching, but still short of, the intensities required for eV-range target heating experiments. We present measurements from the Neutralized Drift Compression Experiment to reach the necessary higher beam intensities, including: (1) axial compression and radial focusing; (2) spatial and temporal distribution of energy deposition at the target plane; and (3) centroid motion of the beam spot through the pulse.

This work was supported by the Office of Fusion Energy Sciences, of the U.S. Department of Energy under Contract No. DE-AC02-05CH11231, W-7405-Eng-48, DE-AC02-76CH3073 for Heavy Ion Fusion Sciences-Virtual National Laboratory (HIFS-VNL).